AMENDMENTS TO THE DRAWINGS:

Applicants submit concurrently herewith six (6) sheets of annotated drawings illustrating Figs. 1-6 and 12-16 with proposed changes thereto shown in red ink, accompanied by six (6) sheets of replacement drawings incorporating the amendments.

Attachments: Replacement Sheets: (6)
Annotated Sheets Showing Changes: (6)

REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested.

Replacement drawing sheets are attached adding the legend "prior art" to Figs. 1-6 and 15 in accordance with the Examiner's request.

Claim 4 has been amended so as to change the plural "claims" to the singular "claim" as required by the Examiner.

Claim 9 has been cancelled without prejudice or disclaimer, thus mooting outstanding objections with respect to this claim.

Claim 11 has been amended so as to make it a proper independent claim incorporating the substance of claim 1 explicitly therewithin.

In response to the rejection of claims 1-16 under 35 U.S.C. §101 as allegedly not reciting statutory subject matter, independent claims 1 and 11 have been amended so as to specifically "tie" the methodology therein recited to use of digital signal processing circuits including a computer-readable memory circuit connected to receive the encoded video sequence and configured to process that sequence in accordance with the claimed processes. In this regard, it is noted that those having skill in the relevant art will readily understand that implementation of the invention using "software" necessarily and inherently requires that the "software" be physically embodied within a computer-readable medium. The undersigned is unaware of any executable "software" not so

embodied. Of course, the applicants' invention can also be practiced by using special purpose digital signal processing circuitry as well. In any event, those having skill in the relevant art will know with certainty that the applicants' claimed invention is not a "mental process," but instead a machine-implemented process that must necessarily be carried out with specially configured digital signal processing circuits (whether so configured by "software" accessed and executed by a CPU from program memory or by hardwired "firmware" or other special purpose dedicated circuitry). Clearly, the applicants' claimed processes are inexorably "tied" to a statutory class of subject matter (e.g., a "machine"). In addition, as those in the art will appreciate, it is impossible to process digital signals without transforming matter and/or the state of matter. Indeed, digital signals can only be represented by transforming the state of physical matter (e.g., the magnetization state of magnetizable media, the state of silicon or other semi-conductor based bi-stable circuits, etc.). So-called "computer" circuits were rightly called "state machines" from the beginning precisely because at each clock cycle, the state of many physical substances within the physical computer/digital computing circuitry necessarily transitions between states.

The rejection of claims 11-14 under 35 U.S.C. §102 as allegedly anticipated by Jinzenji '664 is respectfully traversed.

Since claim 11 has now been amended to proper independent form including the substance of original claim 1 which the Examiner has not alleged to be anticipated, this

ground of rejection is believed to have been mooted, such that no further comment is required.

The rejection of claims 1, 5, 17, 21 and 32-33 under 35 U.S.C. §103 as allegedly being made "obvious" based on Oh WO '879 in view of Meer ("Robust Regression Methods for Computer Vision: A Review") is respectfully traversed.

Oh is directed to a method of encoding digital video data (see abstract) and teaches a motion detection method designed to this purpose which differs fundamentally from applicants' method (e.g., see page 14, lines 14-18 of Oh):

> "*The calculated global motion vectors are used in subsequent picture(s) to offset the search window(s). This is diagrammatically illustrated in FIG. 4 for the case of two global motion vectors per row. The first search window for a current MB to be coded is determined from a reference picture 401 by first determining the position of a co-sited macroblock 402 on the reference picture 401.*"

Oh teaches "*improved methods and apparatus for motion vector detection in a video data encoder*" (page 17, lines 5-7). Oh does not teach the global motion vector calculation of applicant's invention for decoding image data. There is no motivation in Oh for "*decoding the motion vectors of the frame*" – no encoded data is decoded or processed in Oh.

The Examiner is correct in pointing out that Oh claims an invention that "can be incorporated in an integrated circuit for encoding/decoding video data" (page 17, lines

26-29) – however, Oh does not teach all of the functions of such integrated circuit. Oh teaches video data encoding, not video data decoding.

Oh's global motion vectors are calculated based on the results of comparing data from two successive raw, unencoded images from a video sequence. Oh searches a second image of the sequence for a block that matches each block of the previous image from the sequence. Oh then calculates a value of motion vector for each block from the offset (difference in coordinates) between the positions of the matching blocks in the two images.

The applicants' claimed invention processes motion vectors decoded from a motion-compensated inter-frame encoded video sequence (not freshly generated from a comparison of unencoded images), selecting a plurality of sets (N>1), each associated with motion vectors (plural). The plurality of motion vectors is then processed, as presently claimed, to generate a representation of estimated global motion between frames.

Oh does not teach estimating global motion between frames, as applicants claim, but instead Oh generates so-called "global motion vectors" that relate, not to a whole image frame, but to a sub-section thereof (i.e., a row or part of row).

The global motion vectors of Oh are generated by averaging the motion vectors in a section (page 13, lines 1-2). The global motion estimation of the present invention

is one value selected ("*e) selecting the motion estimation*") from a plurality of values for motion estimation ("*calculating a motion estimation for each set*").

The Examiner acknowledges that Oh does not teach "*calculating a **median squared error value** for each motion estimation*". To be more accurate, Oh does not teach calculation of any error value for motion estimation for sets of motion vectors (as presently claimed). The Examiner refers to page 11, lines 4-6 of Oh, but this describes use of error values in the matching of blocks or MB (i.e., parts of images) – see page 10, line 26 to page 11, line 6, particularly "*matching the MB to candidate blocks obtained from one or more search windows from a reference picture stored in a frame buffer*" and "*[t]he matching criterion may be based on minimum of absolute errors, square errors, or other suitable distortion functions*". Oh describes use of error values in the matching of blocks or MB (i.e., parts of images), not calculating error values for motion estimation for sets of motion vectors.

The Examiner acknowledges that Oh does not teach "*the motion estimation **with the least median squared error value** as that representative of the global motion of the frame with respect to a preceding or succeeding anchor frame*". To be more accurate, Oh does not teach selection of any motion estimation for sets of motion vectors as representative of the global motion of the frame with respect to a preceding or succeeding anchor frame (as presently claimed).

The Examiner cites to Oh at page 14, lines 24-26, but here Oh describes selecting a prediction of the position of a macroblock in a subsequent image that best matches a block in the current image – not selection of a motion estimation for sets of motion vectors (as applicants presently claim). For example, see Oh where cited:

> *"[t]he two best macroblock matching predictions obtained from the two search windows are compared and the one giving the best prediction is chosen".*

Meer teaches, at the cited section (page 62, right column), use of the projection pursuit technique for the reduction of a multidimensional regression problem to one dimension. The least median squared error (LMedS) technique is described as used to identify outliers in data. At page 62, left column, the LMedS technique is described as used for line fitting.

The Examiner alleges that Meer teaches calculating a median squared error value for each motion estimation, but no teaching can be found in Meer to use of the LMedS technique to calculating a median squared error value for motion estimation. Similarly, no teaching can be found in Meer to use of the LMedS values for selecting motion estimation.

The methods of applicants' claims 1 and 11 and the system of applicants' claim 17 overcome the effects of noise present in inter-frame encoded motion vectors to allow

for global motion estimations between frames to be accurately performed. No such method or system is taught or even hinted at in the cited prior art.

Given the above-noted deficiencies of both cited references with respect to independent claims 1, 11 and 17, it is not necessary at this time to detail additional deficiencies of this allegedly "obvious" combination of references with respect to other aspects of the rejected claims. Suffice it to note that, as a matter of law, it is impossible for even a *prima facie* case of "obviousness" to be supported unless the cited references teach or suggest each and every feature of a claim.

The rejection of claims 2-4 and 18-20 under 35 U.S.C. §103 as allegedly being made "obvious" based on Oh/Meer in further view of Smolic is also respectfully traversed.

Fundamental deficiencies of Oh/Meer have already been noted above with respect to parent claims. Smolic does not supply those deficiencies and, accordingly, it is not necessary at this time to detail additional deficiencies of this allegedly "obvious" three-way combination of references with respect to the additional aspects of these rejected claims.

The rejection of claims 6-9 and 22-24 under 35 U.S.C. §103 as allegedly being made "obvious" based on Oh/Meer in further view of Subramaniyan '134 is also respectfully traversed.

Once again, fundamental deficiencies of Oh/Meer have already been noted above with respect to parent claims. Subramaniyan does not supply those deficiencies and, accordingly, it is not necessary at this time to discuss additional deficiencies of this allegedly "obvious" three-way combination of references with respect to the other aspects of these rejected claims.

The rejection of claims 10 and 25 under 35 U.S.C. §103 as allegedly being made "obvious" based on Oh/Meer/Subramaniyan in further view of Lee '568 is also respectfully traversed.

Once again, fundamental deficiencies of Oh/Meer have already been noted above with respect to parent claims. Neither Subramaniyan nor Lee supplies those deficiencies and, accordingly, it is not necessary at this time to detail additional deficiencies of this allegedly "obvious" four-way combination of references with respect to the additional aspects of these rejected claims.

The rejection of claims 15-16 under 35 U.S.C. §103 as allegedly being made "obvious" based on Jinzenji '664 in view of Szeliski '918 is also respectfully traversed.

It will be noted that these claims now depend from amended claim 11 which incorporates the substance of original claim 1 – against which the Examiner has not even cited either of these references. The deficiencies already noted above for other cited art are not supplied by these references and, accordingly, it is not believed

necessary at this time to detail additional deficiencies of these references with respect to other aspects of these rejected claims.

The rejection of claims 26-29 under 35 U.S.C. §103 as allegedly being made "obvious" based on Oh/Meer in further view of Jinzenji '664 is also respectfully traversed.

Once again, fundamental deficiencies of Oh/Meer have already been noted above with respect to parent claim 17. Jinzenji does not supply those deficiencies and, accordingly, it is not necessary at this time to detail additional deficiencies of this allegedly "obvious" three-way combination of references with respect to the additional aspects of these rejected claims.

The rejection of claims 30-31 under 35 U.S.C. §103 as allegedly being made "obvious" based on Oh/Meer in further view of Szeliski '918 is also respectfully traversed for similar reasons. Namely, fundamental deficiencies of Oh/Meer have already been noted above with respect to parent claim 17, and the additional references do not supply those deficiencies. Accordingly, it is not necessary at this time to discuss additional deficiencies of this allegedly "obvious" four-way combination of references with respect to the additional aspects of the applicants' claimed invention.

In response to the provisional double patenting rejection of claims 11-16 based on alleged obviousness-type double patenting *vis-à-vis* co-pending application Serial

No. 10/535,420, a suitable terminal disclaimer is attached so as to moot this ground of provisional rejection.

Accordingly, this entire application is now believed to be in allowable form, and a formal notice to that effect is earnestly solicited.

Respectfully submitted,

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